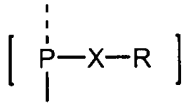
IN THE CLAIMS

Please amend the claims as follows.

1. (Currently Amended) A microchip device comprising a plurality of microlocations, wherein the microlocations each comprise an underlying working microelectrode on a substrate, ~~wherein biomolecules may be transported to the microlocations by the application of an electronic potential to the microelectrode, and~~ wherein at least some of the microelectrodes are covered by a permeation layer comprising at least a first chemical group for attaching biomolecules to the microarray, the first group having the formula:



wherein,

P is a polymerizable moiety covalently attached to one or two moieties selected from the group consisting of a monomeric unit of the permeation layer and another P-X-R group, as defined herein, wherein the other P-X-R group may be the same as or different from the first P-X-R group, further wherein the dashed line is a covalent bond to the second moiety if P is covalently attached to two moieties;

X is a covalent bond or a linking moiety; and

R is a functional moiety for attaching, either covalently or non-covalently, a derivatized biomolecule, or for attaching covalently another P-X-R group, as defined herein, wherein the other P-X-R group may be the same as or different from the first P-X-R group, and wherein R may, optionally, be attached to a biomolecule or another P-X-R group.

2. (Previously Amended) The microarray of claim **1** wherein **P** is selected from the group consisting of alkenyl, α,β-unsaturated carbonyl, vinyl, allyl, and homoallyl moieties.

3. (Previously Amended) The microarray of claim 1 wherein **R** is selected from the group consisting of a covalent bond, streptavidin, a portion of streptavidin, biotin, phenyl boronic acid, salicylic hydroxamic acid, vinyl, allyl, homoallyl, acetal, ester, carboxylic acid, amide, halo-acetamide, thiol, phosphorothiolate monoester, thioester, disulfide, aldehyde, ketone, hydrazide, hydrazine, and amine moieties.

4. (Previously Amended) The microarray of claim **1** wherein **R** is a moiety that requires an activating step prior to participating in a chemical reaction for binding either a derivatized biomolecule or a moiety of another P-X-R group.

5. (Previously Amended) The microarray of claim **4** wherein **R** requires activation by either basic or acidic conditions.

6. (Previously Amended) The microarray of claim **5** wherein the basic or acidic condition necessary to activate **R** may be produced by applying an electronic potential at at least one electrode of the microarray.

7. (Previously Amended) The microarray of claim **1** wherein **P** is covalently attached to at least one other P-X-R group, further wherein the **P** is covalently attached to the **P** moiety of the at least one other P-X-R group.

8. (Previously Amended) The microarray of claim **7** wherein the at least one other P-X-R group is a portion of a polymer, wherein a backbone of the polymer comprises the **P** moieties of a plurality of P-X-R groups covalently attached to one another.

9. (Previously Amended) The microarray of claim **8** wherein the P and/or R moieties of the first P-X-R group and the P-X-R groups in the polymer backbone are the same.

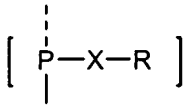
10. (Previously Amended) The microarray of claim **1** wherein **R** is covalently attached to another P-X-R group, further wherein the **R** is covalently attached to the **P** moiety of the other P-X-R group.

11. (Previously Amended) The microarray of claim **10** wherein the other P-X-R group is a portion of a polymer, wherein a backbone of the polymer comprises a plurality of P-X-R groups covalently attached to one another by P-R covalent attachments.

12. (Previously Amended) The microarray of claim **11** wherein the P and/or R moieties of the first P-X-R group and the P-X-R groups in the polymer backbone are the same.

13. (Previously Amended) The microarray of claim **1** wherein **X** is selected from the group consisting of a covalent bond, an alkyl group of 1-10 carbon atoms, an alkenyl group of 2-10 carbon atoms, alkyl esters, ketones, amides, ethers, thioesters, amido groups, carbonyls, and any combinations thereof.

14. (Currently Amended) A microchip device comprising a plurality of microlocations, wherein the microlocations each comprise an underlying working microelectrode on a substrate, ~~wherein biomolecules may be transported to the microlocations by the application of an electronic potential to the microelectrode,~~ wherein at least some of the microelectrodes are covered by a permeation layer comprising first and second chemical groups having the formula



wherein,

the dashed line is a covalent bond to a second moiety if P is covalently attached to two moieties

P is a polymerizable moiety,

X is a linking moiety selected from the group consisting of a covalent bond, an alkyl group of 1-10 carbon atoms, an alkenyl group of 2-10 carbon atoms, alkyl esters, ketones, ethers amides, thioesters, amido groups, carbonyls, and any combinations thereof; and

R is a functional moiety for attaching, either covalently or non-covalently, a derivatized biomolecule;

wherein the first and second P-X-R groups may be the same or different;

wherein the **P** moieties of the first P-X-R groups are covalently attached to the permeation layer matrix and to one **P** of the second P-X-R groups; and

wherein the **P** moieties of the second P-X-R groups are covalently attached to one or two other **P** moieties of other second P-X-R groups to form a polymer of the second P-X-R groups.

15. (Previously Amended) The microarray of claim **14** wherein **R** for the first and second P-X-R groups are, independently, selected from the group consisting of streptavidin, a portion of streptavidin, biotin, phenyl boronic acid, salicylic hydroxamic acid, vinyl, allyl, homoallyl, acetal, ester, carboxylic acid, amide, halo-acetamide, thiol, phosphorothiolate monoester, thioester, disulfide, aldehyde, ketone, hydrazide, hydrazine, and amines.

16. (Previously Amended) The microarray of claim **15** wherein **R** are the same for the first and second P-X-R groups.

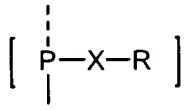
17. (Previously Amended) The microarray of claim **14** wherein **P** of the first and/or second P-X-R groups require activation prior to participating in a polymerization reaction, wherein the activation is either under the same or mutually exclusive conditions.

18. (Previously Amended) The microarray of claim **17** wherein the activation is by basic or acidic conditions.

19. (Previously Amended) The microarray of claim **18** wherein the basic or acidic conditions required for activation may be produced by applying an electronic potential at at least one electrode of the microarray.

20. (Cancelled)

21. (Currently Amended) A microchip device comprising a plurality of microlocations, wherein the microlocations each comprise an underlying working microelectrode on a substrate, ~~wherein biomolecules may be transported to the microlocations by the application of an electronic potential to the microelectrode,~~ wherein at least some of the microelectrodes are covered by a permeation layer comprising first P-X-R groups and second P-X-R groups having the formula:



wherein,

the dashed line is a covalent bond to a second moiety if P is covalently attached to two moieties;

P is a polymerizable moiety,

X is a linking moiety selected from the group consisting of a covalent bond, an alkyl group of 1-10 carbon atoms, an alkenyl group of 2-10 carbon atoms, alkyl esters, ketones, ethers amides, thioesters, amido groups, carbonyls, and any combinations thereof; and

R is a functional moiety for attaching, either covalently or non-covalently, a derivatized biomolecule;

wherein the first and second P-X-R groups may be the same or different;

wherein the **P** moieties of the first P-X-R groups are covalently attached to the permeation layer matrix

wherein the **R** of the first P-X-R group is covalently attached to at least one **P** of the second P-X-R groups; and

wherein the **P** moieties of the second P-X-R groups are covalently attached to one or two other **P** moieties of other second P-X-R groups to form a polymer of the second P-X-R groups.

22. (Previously Amended) The microarray of claim **21** wherein **R** for the first and second P-X-R groups are, independently, selected from the group consisting of streptavidin, a portion of streptavidin, biotin, phenyl boronic acid, salicylic hydroxamic acid, vinyl, allyl, homoallyl, acetal, ester, carboxylic acid, amide, halo-acetamide, thiol, phosphorothiolate monoester, thioester, disulfide, aldehyde, ketone, hydrazide, hydrazine, and amines.

23. (Previously Amended) The microarray of claim **22** wherein **R** is the same for the first and second P-X -R groups.

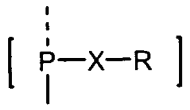
24. (Previously Amended) The microarray of claim **21** wherein the **P** or **R** of the first and/or second P-X-R groups require activation prior to forming a covalent bond between the **P** and **R** of the first and second group, wherein the activation is either under the same or mutually exclusive conditions.

25. (Previously Amended) The microarray of claim **24** wherein the activation is by basic or acidic conditions.

26. (Previously Amended) The microarray of claim **25** wherein the basic or acidic conditions required for activation may be produced by applying an electronic potential at at least one electrode of the electronically addressable microarray.

27. (Cancelled)

28. (Currently Amended) A microchip device comprising a plurality of microlocations, wherein the microlocations each comprise an underlying working microelectrode on a substrate, ~~wherein biomolecules may be transported to the microlocations by the application of an electronic potential to the microelectrode,~~ wherein at least some of the microelectrodes are covered by a permeation layer comprising first P-X-R groups attached to one or two moieties selected from the group consisting of biomolecules and polymerized monomer units comprising second P-X-R groups, wherein the polymerized second P-X-R groups are further attached to biomolecules, wherein the attachment of the biomolecules to the first P-X-R groups or to the polymerized second P-X-R groups requires activation of at least one of the first and/or the second P-X-R groups under acidic and/or basic pH conditions, wherein the first and second P-X-R groups have the formula



wherein,

the dashed line is a covalent bond to a second moiety if P is covalently attached to two moieties;

P is a polymerizable moiety, wherein;

X is a linking moiety selected from the group consisting of a covalent bond, an alkyl group of 1-10 carbon atoms, an alkenyl group of 2-10 carbon atoms, alkyl esters, ketones, ethers amides, thioesters, amido groups, carbonyls, and any combinations thereof; and

R is a functional moiety for attaching, either covalently or non-covalently, a derivatized biomolecule or for attaching covalently an other P-X-R group;

wherein **P** comprises a chemical element requiring activation for attaching to the permeation layer and/or to a **P** of an other P-X-R group; and

wherein **R** comprises chemical elements requiring activation different from **P** of either the first or second P-X-R groups for attaching to biomolecules, or to **P** of another P-X-R groups.

29. (Previously Amended) The microarray of claim **28** wherein the permeation layer comprises a polymer polymerized from a monomer selected from the group consisting of acrylamide, bisacrylamide, methacrylamide, *N*-alkyl acrylamides, functionalized ethylene glycol derivatives, *N*-vinyl pyrrolidinone, bis-cystamine, acrylates, methacrylates, and acrylonitriles.

30. (Previously Amended) The microarray of claim **28** wherein the biomolecules are derivatized with a chemical moiety selected from the group consisting of vinyl, allyl, homoallyl, acetal, ester, carboxylic acid, amide, halo-acetamide, thiol, phosphorothiolate monoester, thioester, disulfide, aldehyde, ketone, hydrazide, hydrazine, and amines.

31. (Previously Amended) The microarray of claim **28** wherein **P** for the first and second P-X-R groups are, independently, selected from the group consisting of alkenyl moieties, α,β-unsaturated carbonyls, vinyl, allyl and homoallyl groups, acetal, thioester, disulfide, epoxides, alkyl ether, and carboxylic acid moieties.

32. (Previously Amended) The microarray of claim **28** wherein the **X** for the first and second P-X-R groups are, independently, selected from the group consisting of a covalent bond, a carbon chain consisting of 1 to 10 carbons, ethers, polyethers, amides, and esters.

33. (Previously Amended) The microarray of claim **28** wherein the **R** for the first and second P-X-R groups are, independently, selected from the group consisting of alkenyl moieties, α,β-unsaturated carbonyls, vinyl, allyl, homoallyl, acetal, ester, carboxylic acid, thioester, disulfide, epoxide, and alkyl ether moieties.

34. (Previously Amended) The microarray of claim **33** wherein the **R** is the same for the first and second P-X-R groups.

35. (Previously Amended) The microarray of claim **28** wherein the acidic or basic conditions are produced by a method selected from the group consisting of contacting the electronic microarray with a buffer of the appropriate pH, applying an electronic potential at at least one electrode of the electronically addressable microarray to alter the pH, and a combination of the two methods.

36. (Previously Amended) The microarray of claim **28** wherein **R** for the first and second P-X-R groups are thioester moieties.

37. (Previously Amended) The microarray of claim **28** wherein **R** for the first and second P-X-R groups are acetal moieties.

38. (Previously Amended) The microarray of claim **28** wherein the **R** is selected from the group consisting of derivatized amine, salicyl hydroxamic acid, bromoacetamide, salicyl hydroxamic acid, maleimide, streptavidin, biotin, vinyl, allyl, homoallyl, acetal, ester, carboxylic acid, amide, halo-acetamide, thiol, phosphorothiolate monoester, thioester, disulfide, aldehyde, ketone, hydrazide, hydrazine, and amine moieties.

39. (Previously Amended) The microarray of claim **35** wherein the electronic potential used to alter the pH is applied at a current density of between 50 nA/5000μm^2 and 5 μA/5000μm^2 at the at least one electrode for a time period between 30 and 600 seconds.

40.-66. (Cancelled)

67. (Previously Added) The microarray of claim **1** wherein **P** is selected from the group consisting of an acetal, epoxide, ester, carboxylic acid, amide, halo-acetamide, thiol,

phosphorothiolate monoester, thioester, disulfide, aldehyde, ketone, hydrazide, hydrazine, and amine moieties.

68. (Previously Added) The microarray of claim **1** wherein **R** is selected from the group consisting of streptavidin, a portion of streptavidin, and biotin.

69. (Previously Added) The microarray of claim **1** wherein **R** is selected from the group consisting of aldehyde, ketone, amine, hydrazine, hydrazide, haloacetamide, epoxide, thiol, phosphorothiolate monoester, and ester moieties.

70. (Previously Added) The microarray of claim **1** wherein **R** is selected from the group consisting of phenyl boronic acid and salicylic hydroxamic acid.

71. (Previously Added) The microarray of claim **1** wherein **R** is selected from the group consisting of disulfide, thioester, tertiary carbon, alkene, alkyl ether, acetal, and carboxylic acid.

72. (Previously Amended) The microarray of claim **14** wherein **P** is selected from the group consisting of alkenyl, α ,β-unsaturated carbonyl, vinyl, allyl, and homoallyl moieties.

73. (Previously Added) The microarray of claim **14** wherein **P** is selected from the group consisting of an acetal, epoxide, ester, carboxylic acid, amide, halo-acetamide, thiol, phosphorothiolate monoester, thioester, disulfide, aldehyde, ketone, hydrazide, hydrazine, and amine moieties.

74. (Previously Added) The microarray of claim **14** wherein **R** is selected from the group consisting of streptavidin, a portion of streptavidin, and biotin.

75. (Previously Added) The microarray of claim **14** wherein **R** is selected from the group consisting of aldehyde, ketone, amine, hydrazine, hydrazide, haloacetamide, epoxide, thiol, phosphorothiolate monoester, and ester moieties.

76. (Previously Added) The microarray of claim **14** wherein **R** is selected from the group consisting of phenyl boronic acid and salicylic hydroxamic acid.

77. (Previously Added) The microarray of claim **14** wherein **R** is selected from the group consisting of disulfide, thioester, tertiary carbon, alkene, alkyl ether, acetal, and carboxylic acid.

78. (Previously Added) The microarray of claim **14** wherein the **R** moieties of the first and/or second P-X-R groups require activation prior to covalent attachment to a biomolecule, wherein the activation is either under the same or mutually exclusive conditions for the first and second groups.

79. (Previously Added) The microarray of claim **78** wherein the activation is by basic or acidic conditions.

80. (Previously Added) The microarray of claim **79** wherein the basic or acidic conditions required for activation may be produced by applying an electronic potential at at least one electrode of the electronically addressable microarray.

81. (Previously Amended) The microarray of claim **21** wherein **P** is selected from the group consisting of alkenyl, α ,β-unsaturated carbonyl, vinyl, allyl, and homoallyl moieties.

82. (Previously Added) The microarray of claim **21** wherein **P** is selected from the group consisting of an acetal, epoxide, ester, carboxylic acid, amide, halo-acetamide, thiol,

phosphorothiolate monoester, thioester, disulfide, aldehyde, ketone, hydrazide, hydrazine, and amine moieties.

83. (Previously Added) The microarray of claim **21** wherein **R** is selected from the group consisting of streptavidin, a portion of streptavidin, and biotin.

84. (Previously Added) The microarray of claim **21** wherein **R** is selected from the group consisting of aldehyde, ketone, amine, hydrazine, hydrazide, haloacetamide, epoxide, thiol, phosphorothiolate monoester, and ester moieties.

85. (Previously Added) The microarray of claim **21** wherein **R** is selected from the group consisting of phenyl boronic acid and salicylic hydroxamic acid.

86. (Previously Added) The microarray of claim **21** wherein **R** is selected from the group consisting of disulfide, thioester, tertiary carbon, alkene, alkyl ether, acetal, and carboxylic acid.

87. (Previously Added) The microarray of claim **1** wherein the permeation layer comprises a polymer polymerized from a monomer selected from the group consisting of acrylamide, bisacrylamide, methacrylamide, *N*-alkyl acrylamides, functionalized ethylene glycol derivatives, *N*-vinyl pyrrolidinone, bis-cystamine, acrylates, methacrylates, and acrylonitriles.

88. (Previously Added) The microarray of claim **14** wherein the permeation layer comprises a polymer polymerized from a monomer selected from the group consisting of acrylamide, bisacrylamide, methacrylamide, *N*-alkyl acrylamides, functionalized ethylene glycol derivatives, *N*-vinyl pyrrolidinone, bis-cystamine, acrylates, methacrylates, and acrylonitriles.

89. (Previously Added) The microarray of claim **21** wherein the permeation layer comprises a polymer polymerized from a monomer selected from the group consisting of

acrylamide, bisacrylamide, methacrylamide, *N*-alkyl acrylamides, functionalized ethylene glycol derivatives, *N*-vinyl pyrrolidinone, bis-cystamine, acrylates, methacrylates, and acrylonitriles.